



# Novel protein production systems

Through our Future Protein Mission, we are creating new complementary protein industries based on advanced biomanufacturing processes for yeast, fungi, algae and insects.

## The challenge and opportunity

Demand for protein is large and growing. Global demand is expected to increase by 20 per cent between 2018 and 2025 and can only be met through a combination of animal, plant and novel protein production systems.

Our protein roadmap outlined a \$1.45 billion opportunity to develop a new Australian industry based on precision fermentation as a rapidly growing advanced biomanufacturing technology. By relying on microbes (yeast, fungi, algae) as production factories we can unlock complementary protein sources for formulation into new Australian-made products for growing domestic and export markets.

Insect farming is a second potential growth industry for Australia with immediate opportunities in food waste recycling for livestock feed. It's anticipated that insect farming in Australia – just for the use of animal feed – could be worth \$32 million by 2030.

Finally, the Mission is also exploring new ways to tap into food production waste streams and turn them into new protein products. This would tackle food wastage and create new sustainable Australian industries and products.

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**Our goal is to utilise waste and low-value food streams to create emerging complementary protein industries and products based on advanced biomanufacturing techniques.**

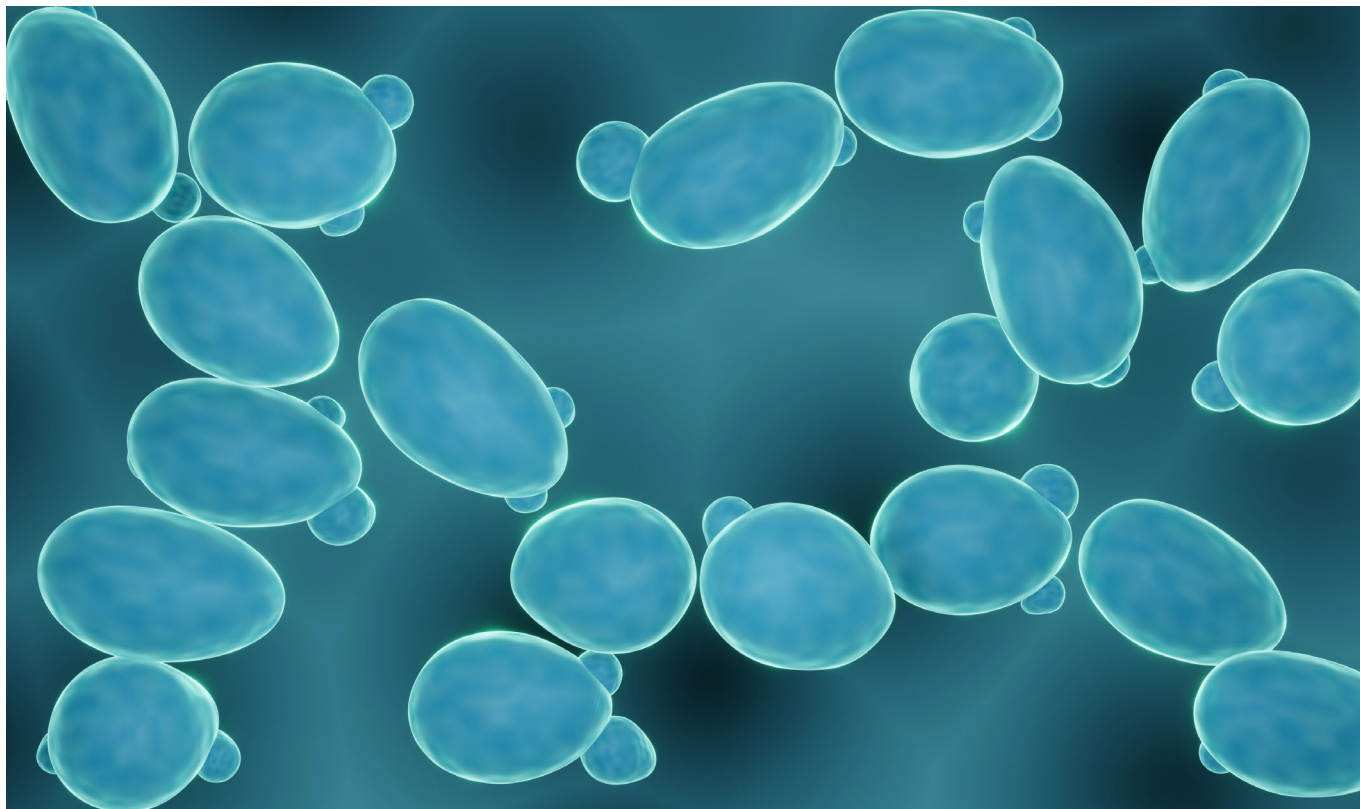
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## Our solutions

The Mission is working across government, industry and the research sector to create and grow emerging protein industries.

Examples of activities include:

- **Create new complementary protein products derived from precision fermentation** – As an example, researchers at our Food Innovation Centre are working with Eden Brew, a company created with support from CSIRO, to develop new animal-free dairy products.
- **Scaling up precision fermentation** – we are accelerating and scaling up Australia's R&D expertise and facilities in precision fermentation. To support science innovation and future opportunities, we assist in assessing health, safety, regulatory, and sustainability of novel protein production systems.
- **Emerging insect industry** – we are supporting the growth of an emerging insect industry through the delivery of proof-of-concept R&D for using insects to transform waste and optimise animal protein production.
- **Wealth from waste** – we are working towards reducing the waste associated with current food systems by upcycling protein-rich biomass such as vegetable residues, brewers spent grain, and fermentation biomass. Our aim is to establish regional processing facilities to transform these waste streams into higher value protein products.



Proteins can be made from yeast (pictured) using fermentation techniques.

## Towards impact

The Future Protein Mission is driving novel protein production R&D to:

- Transform low or no-value food production streams.
- Establish facilities to scale-up novel protein production technologies such as precision fermentation.
- Understand consumer needs, nutritional profiles, regulatory policies and impacts of emerging industries.
- Develop new products derived from fermentation.
- Research potential for emerging insect industry for waste management and as an animal feed.

## Join our Mission

The Future Protein Mission is helping Australia capture high-growth global protein markets.

Partner with us to jump on one of Australia's big opportunities, including:

- Food manufacturers looking to deliver new product formats to address changes in consumer trends such as health, wellness, convenience and sustainability.
- Fermentation-derived protein ingredients and biomass, including formulation as hybrid or blended products.
- Insect protein sources for feed markets.
- Join in establishing Australia's national fermentation infrastructure at pre-commercial scale.
- Take part in helping design proposed new national food innovation facilities.

**As Australia's national science agency and innovation catalyst, CSIRO is solving the greatest challenges through innovative science and technology.**

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### Contact us

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